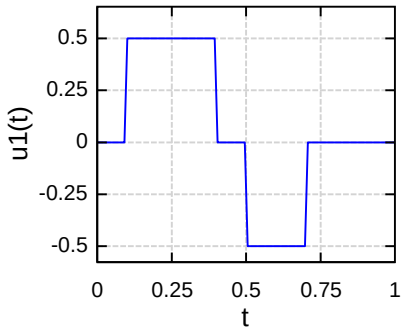
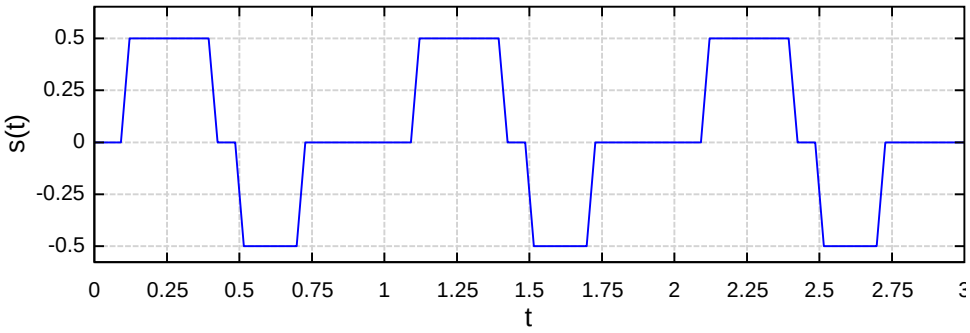
Расчёт коэффициентов ряда Фурье при помощи метода БПФ

$U_o := 0.5$ $M := 3$ $T := 1$ мс $t_{max} := M \cdot T$ appVersion(4) = "1.2.9018.0"

$$u_1(t) := (0.1 \cdot T \le t) \cdot t < 0.4 \cdot T \cdot U_o - (0.5 \cdot T \le t) \cdot (t < 0.7 \cdot T) \cdot U_o$$

$$s(t) := \sum_{m=0}^{M-1} u_1(t - m \cdot T)$$





$u_1(t \text{ мс})$ $s(t \text{ мс})$

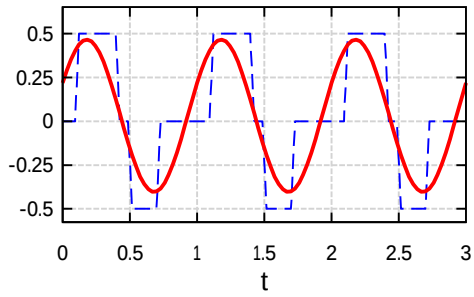
$N := 2^4 = 16$ $\Delta t := \frac{T}{N}$ $\Delta f := \frac{1}{T}$ $u := \overrightarrow{u_1([0..(N-1)] \cdot \Delta t)}$

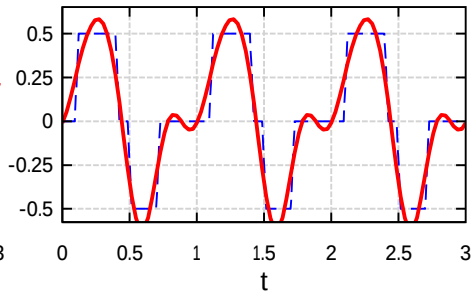
$xy := \text{al\_fftc1d}(u)$ $x := \text{Re}(xy)$ $y := \text{Im}(xy)$

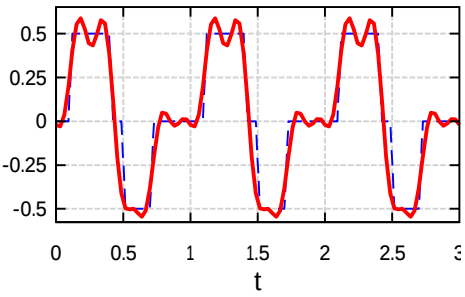
$ab := \frac{2}{N} \cdot [\, x \;\; -y \,]$ $\omega_1 := \frac{2 \cdot \pi}{T}$

$a := ab^{\langle 1 \rangle}$ $b := ab^{\langle 2 \rangle}$

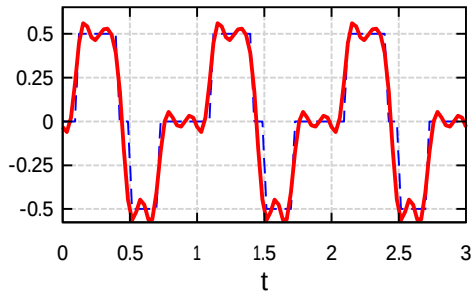
$$v(n, t) := \frac{a_1}{2} + \sum_{k=1}^{n} a_{k+1} \cdot \cos(k \cdot \omega_1 \cdot t) + b_{k+1} \cdot \sin(k \cdot \omega_1 \cdot t)$$

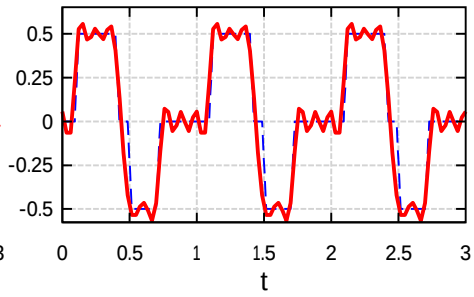


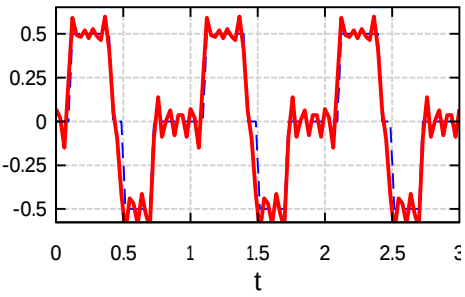




$\begin{cases} s(t \text{ мс}) \\ v(1, t \text{ мс}) \end{cases}$ $\begin{cases} s(t \text{ мс}) \\ v(3, t \text{ мс}) \end{cases}$ $\begin{cases} s(t \text{ мс}) \\ v(5, t \text{ мс}) \end{cases}$







$\begin{cases} s(t \text{ мс}) \\ v(7, t \text{ мс}) \end{cases}$ $\begin{cases} s(t \text{ мс}) \\ v(9, t \text{ мс}) \end{cases}$ $\begin{cases} s(t \text{ мс}) \\ v(11, t \text{ мс}) \end{cases}$